

# Changing the world to a circular economy

Worldwide, more than two billion metric tons of municipal solid waste is produced each year. By 2050, this figure is predicted to increase by 70%. At the **University of Sheffield** in the UK, **Professor Andrea Genovese** and **Dr Tommaso Calzolari** are working on implementing circular economy practices that produce less waste. They are also encouraging businesses and governments to reuse, share, repair, lease and recycle.



**Professor Andrea Genovese**

Chair in Logistics and Supply Chain Management,  
Sheffield University Management School, UK



**Dr Tommaso Calzolari**

Research Associate,  
Sheffield University Management School, UK

## Fields of research

Logistics and supply chain management,  
operations research

## Research project

Realising the Transition to the Circular  
Economy (ReTraCE)

## Funder

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie Innovative Training Networks (H2020-MSCA-ITN-2018) scheme, grant agreement number 814247 (ReTraCE).

**A**s population, climate change damage and waste production all increase dramatically across the globe, the concept of a circular economy is becoming more and more popular. At the University of Sheffield, Professor Andrea

Talk like a ...

## supply chain management researcher

**Circular economy** — a system that minimises the use of resources and creation of waste by sharing, reusing, recycling and repairing products instead of manufacturing new ones

**Global South** — countries which are typically located to the south of more industrialised northern nations (called the Global North) and which are regarded as having a lower level of economic development

**Logistics** — a part of supply chain management that deals

with managing how resources are acquired, stored, transported and distributed

**Multinational enterprise** — an organisation that owns and controls the production of items in at least one country other than its home country

**Municipal solid waste** — everyday waste items that are discarded by the public

**Supply chain** — the network involved in the production and distribution of a product

Genovese and Dr Tommaso Calzolari are encouraging companies and governments to adopt circular economy practices and improve environmental and social sustainability worldwide.

## What is the circular economy?

The circular economy is a production and consumption concept, which revolves around trying to decrease waste as much as possible by sharing, reusing, repairing and recycling products for as long as possible. This is an alternative to a traditional, linear economic model, where items are

produced as cheaply as possible and thrown away at the end of their life.

Examples of everyday circular economy practices include libraries, repair workshops and 'upcycling' DIY projects. In the UK, policies such as the charge for single-use plastic bags (which came into effect in 2015) and the ban of single-use plastic straws and stirrers (in 2020) support the concept of the circular economy.

## Supply chain management

Andrea and Tommaso work in supply chain management research, investigating how to make supply



chains more efficient. They also study sustainable business models to decrease the amount of waste produced worldwide in practices such as fast fashion and the mass production of unethical, low-quality items.

### Case study: how does fast fashion work?

Multinational enterprises that produce fast fashion do so by using the lower production costs in the Global South to make cheaper products for consumers in the Global North. “From a narrow economic perspective, fast fashion might seem like innovation, but it has many negative side effects and issues with how value and risks are distributed across the stakeholders in the supply chain (workers in the Global South and shareholders in the Global North),” explains Tommaso.

The concept of fast fashion comes with many negative social and environmental impacts. “In a circular economy, innovation should at least consider these negative impacts and, hopefully, aim for a more radical approach that includes justice and fairness,” says Tommaso.

### The ReTraCE project

Andrea and Tommaso were part of the ReTraCE project, which stands for **Realising the Transition to the Circular Economy**.

The ReTraCE project was an interdisciplinary, collaborative project involving 14 countries. “It brought together motivated researchers from diverse backgrounds, including environmental science, politics, engineering and business, who collaborated under the guidance of experienced mentors and experts,” explains Andrea.

The ReTraCE project studied circular economy practices to foster innovative approaches, share valuable knowledge between researchers and encourage engagement in circular economy ideas. In Sheffield, the project was involved in organising free workshops to teach practical skills such as replacing buttons on clothes, fixing taps and mending cables and plugs, thanks to the help of **Reyt Repair**.

### How did the ReTraCE team study circular economy practices?

Firstly, the ReTraCE team interviewed industry professionals trying to implement circular economy practices in their supply chains. “These interviews helped us understand how theoretical concepts relate to real-world practices,” says Tommaso. The team then collected data from different organisations and examined them using statistical analysis tools.

### Why are companies and governments not already using circular economy practices?

Tommaso and Andrea found that most multinational enterprises currently have a very limited and narrow view of the circular economy. “These companies, driven by capitalist growth goals, often adopt very basic circular economy practices,” says Tommaso.

“Multinational enterprises mostly focus on replacing new materials with recycled ones or using renewable energy for some of their operations,” Andrea adds. “It’s rare to see them adopting business models like products as a service, and they never do anything that might affect their short-term economic growth.”

### What can be done to help?

The ReTraCE project hopes to help both companies and governments transition to circular economy practices. “For governments, our findings will offer a better understanding of the complex pressures that affect multinational enterprises, helping to shape policies that support sustainable business practices, while considering the challenges these companies face,” says Andrea.

For companies, the project can provide advice and insights into how supply chain mechanisms could be improved to be more sustainable. “For effective circular economy practices, multinational enterprises need integrated structures,” Andrea explains. “These help them work with suppliers to design new circular products and with customers to manage more complex material flows.”

“Strong regulations, as well as different social norms and values, are also needed to encourage multinational enterprises practices,” says Tommaso.

### What is next for the ReTraCE team?

Andrea and Tommaso will continue to research circular economy practices, with the hope of finding more ways to promote and implement sustainable business models worldwide.

In his personal research, Tommaso is also particularly interested in researching how supply chains might work in a post-growth economy, where ecological impacts are prioritised over consumption. Can you imagine our world like this?

# About *supply chain management research*

**S**upply chain management research involves investigating how companies produce items and what areas of the supply chain can be improved for financial, environmental, ethical or social benefits. “Supply chain management is not just about outsourcing production to produce cheap, mass-consumption products,” says Tommaso. “It requires critical thinking and should serve higher societal purposes.”

“The future development of supply chains is also a political challenge, involving environmental respect, reduced consumption, and ethical technological development,” says Tommaso.

“Highlighting these aspects can help shape a more sustainable and socially responsible approach to supply chain management.”

The future of supply chain management research will involve coming up with new, innovative sustainable development and business ideas that are good for people and the environment around them. “We should criticise the idea of innovation when it simply drives more consumerism or workers exploitation,” says Tommaso.

## **What are the rewards of supply chain management research?**

“Research in supply chain management is rewarding because it helps us understand how supply chains work from both technological and relational perspectives. It involves exploring why companies adopt certain practices and how they view sustainability. By studying these aspects, we can uncover the reasons behind their choices and work towards more efficient, fair and sustainable supply chains. This research can lead to real-world improvements that benefit businesses, consumers and the environment,” explains Tommaso.

## **What research opportunities will the future offer?**

“The next generation of supply chain management researchers will have many exciting opportunities,” says Tommaso. “They will develop new methods to analyse data in powerful ways and explore the impact of new technologies on supply chain relationships. It’s also important to critically analyse why supply chains are in crisis today and how they perpetuate post-colonial exploitation through power imbalances. Researchers will work on overcoming these challenges and investigate supply chain mechanisms in economic systems that are not focused on growth and consumerism.”

## **Pathway from school to supply chain management research**

“Focus on subjects like maths and statistics to build strong analytical skills,” advises Tommaso. “It’s also important to study social sciences to understand that supply chain issues are not just technological but also political, involving winners and losers. This combination of subjects will provide a well-rounded understanding of both the technical and human aspects of supply chain management, preparing you to address complex challenges in the field.”

At university, study an undergraduate degree such as logistics, supply chain management or industrial engineering. (Andrea and Tommaso both came into the field from a background in industrial engineering.) You will then need to complete a master’s degree and a PhD in operational research or a similar field if you want to work in supply chain management research.

Read this article from Prospects to learn more about studies in supply chain management and the skills required for the field: [www.prospects.ac.uk/jobs-and-work-experience/job-sectors/retail/why-choose-a-career-in-logistics-and-supply-chain-management](http://www.prospects.ac.uk/jobs-and-work-experience/job-sectors/retail/why-choose-a-career-in-logistics-and-supply-chain-management)





## Explore careers in *supply chain management research*

Tommaso recommends reading or watching videos about companies like Zara, Amazon and eBay, which have used effective supply chain management to become successful. “Books such as *Land Grabbing* by Stefano Liberti can give you insights into the complexities and issues of long supply chains,” says Tommaso.

Watch *The Story of Stuff* ([www.youtube.com/watch?v=9GorqoigqM](https://www.youtube.com/watch?v=9GorqoigqM)), a 20-minute video that provides an incredible look at where the stuff in our homes comes from and how it affects the rest of the world.

Tommaso recommends researching the work of non-governmental organisations (NGOs) that focus on supply chain and sustainability issues.

Read this article on the benefits of the circular economy ([www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits](https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits)). Read about the European Parliament’s ‘Right to Repair’ initiative ([www.europarl.europa.eu/news/en/press-room/20240419IPR20590/right-to-repair-making-repair-easier-and-more-appealing-to-consumers](https://www.europarl.europa.eu/news/en/press-room/20240419IPR20590/right-to-repair-making-repair-easier-and-more-appealing-to-consumers)) that Tommaso is currently researching, to learn more about circular economy policies.

According to Glassdoor, the average salary for a supply chain analyst in the UK is £36,000, but this figure can be higher depending on



# Q&A

## Meet Tommaso

### What inspired you to pursue a career in operations research?

I’ve always been fascinated by how the economy functions, and supply chains play a crucial role in this process. Recognising that supply chains are now considered a competitive advantage for businesses inspired me to delve deeper into this field. This interest led me to pursue research in operations and supply chain management, aiming to understand and improve the complex systems that drive economic activity.

### How did working in industry influence your career aspirations?

Working in the manufacturing industry for almost two years before starting my PhD was crucial in shaping my career. The experience gave me a deep understanding of how global supply chains operate, including the key processes and players involved. My shift to research was driven by my analytical inclination and a desire to understand social phenomena more broadly, rather than focusing solely on practical tasks. This blend of hands-on industry experience and a passion for analysis has been instrumental in guiding my career path.

### What are your proudest career achievements so far?

Defending my PhD thesis, teaching my first class of students and publishing my first academic paper. Additionally, mastering how to conduct qualitative interviews has been a significant milestone, as it has allowed me to gain valuable insights and connect theory with real-world practices.

### What are your aims for the future?

My future aims are to continue researching ecological production systems and to teach students about these important topics. I want to incorporate a critical perspective into my research, exploring what supply chains look like in a context that isn’t driven only by economic growth. I’m particularly interested in understanding supply chains in a post-growth world, where there are strong ecological priorities and limits to production and consumption.

---

### Tommaso’s top tips

1. Follow your passions and pursue what you love.
2. Don’t be afraid to ask for help and learn from others who have more experience.
3. Always be curious, read widely and work on developing your talents. Stay dedicated and you’ll find your way to success.